

Cytopathological Pattern of Tubercular Lymphadenopathy on Fine Needle Aspiration Cytology (FNAC) in a Tertiary Care Hospital

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Received: 20-08-2022 / Revised: 25-09-2022 / Accepted: 30-10-2022

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Conflict of interest: Nil

Abstract

Aim: The aim of the present study was to evaluate the cytopathological patterns of tubercular lymphadenopathy on Fine Needle Aspiration Cytology in a tertiary care hospital.

Methods: The Retrospective Study was conducted in the Department of Pathology of Narayan Medical College & Hospital, Jamuhar, district Rohtas, Bihar. 130 patients were included in the study. All the patients referred to the cytopathology lab for FNAC of lymph nodes between December 2020 to September 2021 were included.

Results: Out of 130 patients, 61 (46.92%) were males and 69 (53.08%) were females. The age of the patients ranged from 1-71 years with mean age being 28.97±14.4 years. There was slight female preponderance with male to female ratio of 1:1.13. The disease was more commonly seen in the age group of 21-30 years (42%). Most commonly involved lymph node was cervical (74%) followed by supraclavicular lymph node (13.1%). The most common anatomical region of Tuberculous Lymphadenitis was 73.8% followed by supraclavicular 13.1%. The most common pattern observed was epithelioid granuloma with caseous necrosis (70 cases, 53.85%). ZN stain for AFB showed AFB positivity in 48 cases. Thus, overall AFB positivity was 36.9%.

Conclusion: FNAC is useful for the diagnosis of tuberculous lymphadenitis. In developing countries with high prevalence of tuberculosis, FNAC with ZN stain should be the first line of investigation in patients presenting with superficial lymphadenopathy.

Keywords: Cytopathological pattern, FNAC, Tubercular lymphadenopathy, Ziehl- neelsen staining

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Introduction

Lymphadenopathy is one of the common clinical problems with varied etiological

considerations. The discovery and speedy diagnosis of enlarged lymphnodes is of

great clinical importance. Fine needle aspiration cytology (FNAC) has become an important adjunct to the study of peripheral lymphadenopathy, as a rapid, reliable and inexpensive method of making a diagnosis and is particularly relevant in developing countries like India where facilities for surgical biopsy are scarce. Tuberculous lymphadenitis is one of the most common causes of lymph node enlargement in developing countries. [1]

Diagnosis of tuberculosis can be done by various diagnostic methods as fine needle aspiration cytology (FNAC), biopsy, Acid fast bacilli (AFB) culture and polymerase chain reaction (PCR). FNAC is a routine cytological technique for diagnosis of tuberculous lymphadenitis as it has sensitivity and specificity of 88-96%. FNAC is economical and rapid compared to other tests as AFB culture and PCR. [2] It prevents unnecessary biopsy of lymph nodes and it can be used for collection of material for cytopathological and bacteriological examination. [3]

For cytological diagnosis of tuberculosis, demonstration of epithelioid cell granulomas with or without caseous necrosis is needed. [4-8] Demonstration of AFB bacilli by Ziehl-Neelsen (ZN) stain provides definitive diagnosis. Other tests as serum adenosine deaminase (ADA) can also be used as an adjunctive tool for diagnosis. With the advent of HIV, there is a global upsurge of mycobacterial infection and tuberculosis has become a major cause of morbidity and mortality. [9] In India, the incidence of tuberculosis is high and tuberculosis is the leading cause of lymphadenopathy. [1]

Standard diagnostic algorithm for TBLN in India recommends FNAC along with Ziehl-Neelsen (ZN) staining for acid fast bacilli (AFB) in clinically suspected patients. [10] However, this has the disadvantages of nonspecific findings on cytological examination and poor sensitivity by ZN smears. [11] Mycobacterial culture being a gold

standard method could be useful as a definitive diagnosis. [12] Although enormous literature is available on various aspects of disease including cytological patterns and its incidence in others parts of India and in other countries, only limited literature is available regarding its incidence and morphological spectrum on cytology. In our population with limited resources and high tubercular disease burden, presence of epithelioid cell granuloma is considered as an evidence of tubercular lymphadenitis.

The aim of the present study was to evaluate the cytopathological patterns of tubercular lymphadenopathy on Fine Needle Aspiration Cytology in a tertiary care hospital.

Methods

The Retrospective Study was conducted in the Department of Pathology of Narayan Medical College & Hospital, Jamuhar, district Rohtas, Bihar. 130 patients were included in the study. All the patients referred to the cytopathology lab for FNAC of lymph nodes between December 2020 to September 2021 were included.

The clinical data were collected included patient's age, sex, location of lymph nodes, clinical presentation, cytopathological patterns and special staining for AFB. All cases were categorized cytologically into three categories. The cytomorphological patterns were:

- a) epithelioid granuloma without caseous necrosis
- b) epithelioid granuloma with caseous necrosis
- c) caseous necrosis without epithelioid granuloma with.

ZN stains in all cases were reviewed.

The diagnosis of tuberculous lymphadenitis was based on characteristic cytomorphological features consisting of epithelioid granuloma with or without Langhan giant cells and caseous necrosis

and confirmed by ZN stain. Data analysis was done using the Statistical Package for Social Science (SPSS, Version 17) for windows. Chi-square test was done to

correlate cytomorphological pattern and AFB positivity. A P value <0.05 was considered as significant.

Results

Table 1: Distribution of tuberculous lymphadenitis in different age groups and sex

Age group	Male	Female	Total
1-10 years	7	3	10 (7.7%)
11-20 years	9	15	24(18.5%)
21-30 years	20	35	55(42.3%)
31-40 years	8	10	18(13.8%)
41-50 years	5	3	8(6.2%)
51-60 years	7	3	10(7.7%)
61-70 years	3	0	3(2.3%)
71-80 years	2	0	2(1.5%)
Total	61 (46.92%)	69 (53.08%)	130

Out of 130 patients, 61 (46.92%) were males and 69 (53.08%) were females. The age of the patients ranged from 1-71 years with mean age being 28.97 ± 14.4 years. There was slight female preponderance with male to female ratio of 1:1.13. The

disease was more commonly seen in the age group of 21-30 years (42%). Most commonly involved lymph node was cervical (74%) followed by supraclavicular lymph node (13.1%).

Table 2: Distribution of sites of Tuberculous Lymphadenitis

Anatomical region	n	%
Cervical	96	73.8%
Supraclavicular	17	13.1%
Axillary	8	6.2%
Inguinal	4	3.1%
Submandibular	3	2.3%
Submental	2	1.5%
Total	130	100

The most common anatomical region of Tuberculous Lymphadenitis was 73.8% followed by supraclavicular 13.1%

Table 3: Cytopathological Patterns OF Tuberculous Lymphadenitis

Cytopathological Pattern	N (%)	AFB positive cases	AFB negative cases
Epithelioid granuloma without caseous necrosis	47 (36.15%)	2	45
Epithelioid granuloma with caseous necrosis	70 (53.85%)	36	34
Caseous necrosis without Epithelioid granuloma	13 (10%)	10	3
Total	130 (100%)	48 (36.9%)	82 (63.1%)

The most common pattern observed was epithelioid granuloma with caseous necrosis (70 cases, 53.85%). ZN stain for AFB showed AFB positivity in 48 cases. Thus, overall AFB positivity was 36.9%.

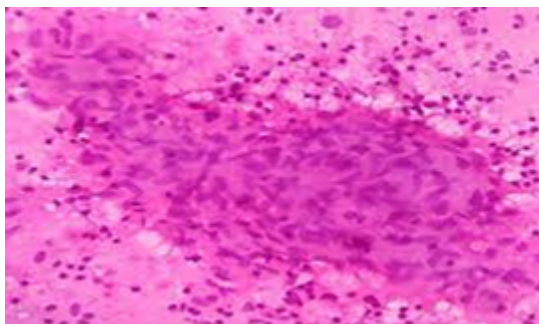


Figure 1: Epithelioid Granuloma without caseous necrosis

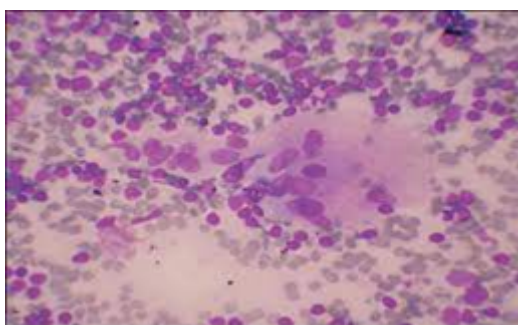


Figure 2: Epithelioid Granuloma with Caseous necrosis

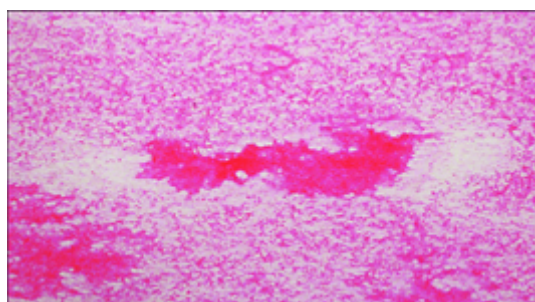


Figure 3: Caseous necrosis without epithelioid granuloma

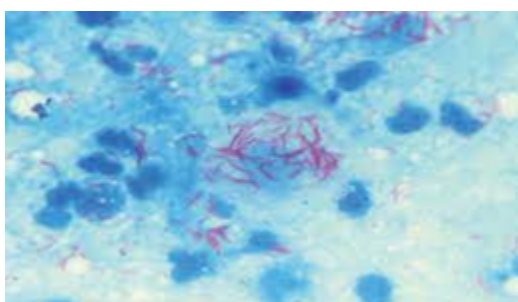


Figure 4: AFB demonstrated on ZN staining

Discussion

FNAC is simple, safe and cost effective outpatient procedure. It is used as a first line of investigation for the reliable

diagnosis of tuberculous lymphadenitis in patients presenting with lymphadenopathy. [13] Tuberculous lymphadenitis can be seen in any age group.

Maximum incidence of tuberculous lymphadenitis was seen in the age group of 21-30 years followed by 11-20 years. This finding is in agreement with the study by Hemalatha A et al, and Paliwal N et al. [14,15] Our study showed slight female predominance with male to female ratio of 1:1.13. This is in concordance with other studies. [1,3,15,16] Cervical lymph node was the most common site involved (85.53%) in the present study which was similar to other studies. [1,15,17] Paliwal N et al, and Bezabih M et al noted cervical lymph node involvement in 90% and 74.2% of cases respectively. [15,17]

In the present study the lesions were categorized into three cytomorphological patterns: pattern A- epithelioid granuloma without caseous necrosis, pattern B- epithelioid granuloma with caseous necrosis, pattern C- caseous necrosis without epithelioid granuloma with neutrophilic infiltrate. The most common cytomorphological pattern observed in our study was epithelioid granuloma with necrosis, seen in 53.85% cases. This was also the commonest pattern in the study by Khanna A et al, Bhattacharya S et al and Prasoon D et al. [18-20]

The presence of caseous necrosis without epithelioid granuloma was the least common pattern in our study, seen in 10% cases. Das DK et al and Bhattacharya S et al reported this pattern in 25.3% and 17.7% cases respectively. [5,19] The overall AFB positivity in the present study was 36.9%. In different studies AFB positivity was seen ranging from 7.4 to 55.2% cases. [5,19,21,22]

Cell mediated immunity of the patient elicits granulomatous response against tubercle bacilli, hence smears containing epithelioid granuloma without necrosis show least AFB positivity. The smears with only necrotic material show maximum AFB positivity due to compromised immune status of the patient and lack of granulomatous response. [19] Paliwal N et al and Bezabih M et al

reported 71% and 59.5% overall AFB positivity respectively. [15,17] The low AFB positivity in our study may be due to the presence of epithelioid cell granulomas with or without necrosis in maximum cases (91.2%) in contrast to the study by Paliwal N et al where it was 30.7%. [15] AFB positivity can be increased by doing repeat FNAC. [23] The difference among three cytological patterns and AFB positivity in our study were statistically significant ($p < 0.001$).

Diagnostic difficulties arise in smears showing only epithelioid cell granuloma with AFB negativity. Such pattern can be seen in sarcoidosis, brucellosis, Hodgkin lymphoma and metastatic disease. Smears showing only necrosis without epithelioid cell granuloma and AFB negativity can be seen in malignancy, especially squamous cell carcinoma in elderly patients. In such cases clinical correlation along with other investigations as biopsy, AFB culture, ADA and PCR may be useful. PCR has been found to be valuable in cases with absence of granuloma or necrosis with 100% diagnostic accuracy if FNAC is combined with PCR. [24,25]

Conclusion

FNAC is useful for the diagnosis of tuberculous lymphadenitis. In developing countries with high prevalence of tuberculosis, FNAC with ZN stain should be the first line of investigation in patients presenting with superficial lymphadenopathy.

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